

CLAIMS

What is claimed is:

1. A method to reduce optical intensity modulation, comprising:
generating a spiraling wave onto an acoustic-optic interaction portion of an optical fiber within an acousto-optic filter in order to create reflected wave components that are orthogonal with respect to wave components that are originally launched onto said interaction portion.
2. The method of claim 1 further wherein said generating further comprises:
inducing a first stress to a transducer in a first direction with a first signal, said first stress being transformed into a first component of said spiraling wave;
and
inducing a second stress to said transducer in a second direction with a second signal, said second stress being transformed into a second component of said spiraling wave, said second having a phase difference with said first signal.
3. The method of claim 2 wherein said first and second wave components are perpendicular to each other.
4. The method of claim 2 wherein said first and second signals are 90° out of phase with respect to each other.
5. The method of claim 2 wherein said first and second signals have a different frequency.

6. The method of claim 2 wherein said first and second components have different amplitudes.

7. The method of claim 1 wherein said generating further comprises:
inducing a stress to an acoustic transducer along an axis;
amplifying said stress with a cone having an elliptical cross section;
and,
transferring said amplified stress to said acoustic-optic interaction portion of said optical fiber.

8. The method of claim 7 wherein said elliptical cross section has a second axis oriented at 45° with respect to said axis.

9. The method of claim 8 wherein said acoustic transducer is a ring.

10. The method of claim 1 wherein said generating further comprises applying electronic signals to said transducer.

11. The method of claim 10 further comprising monitoring said spiraling and adjusting said electronic signals in response to said monitoring.

12. A transducer, comprising:
a first section and a second section, said first and second sections each having a polling direction along a first axis; and
a third section and a fourth section, said third and fourth sections each having a polling direction along a second axis, said third and fourth sections each between said first and second sections.

13. The transducer of claim 12 wherein said first axis and said second axis are perpendicular to each other.

14. The transducer of claim 12 wherein said polling direction of said first section points in a direction opposite to said polling direction of said second section.

15. The transducer of claim 12 wherein said polling direction of said third section points in a direction opposite to said polling direction of said fourth section.

16. The transducer of claim 12 wherein said polling direction of said first section and said second section are uni-directional.

17. The transducer of claim 12 wherein said transducer is a transducing ring and said polling direction of said first section and said second section vary radially around said ring.

18. The transducer of claim 12 wherein said transducer is configured to receive a first signal at said first section and receive a second signal at said third section.

19. The transducer of claim 18 wherein said first and second signals are 90° out of phase with respect to each other.

20. The transducer of claim 18 wherein said first signal has first frequency and said second signal has a second frequency, said first frequency different than said second frequency.

21. The transducer of claim 18 wherein, to generate a first spiraling wave and a second spiraling wave where said first spiraling wave is orthogonal to said second spiraling wave, said first signal includes a first component having a first frequency and a second component having a second frequency, and, said second signal includes a first component having said first frequency and a second component having said second frequency, said first component of said first signal having a phase difference with respect to said first component of said second signal, said second component of said first signal having a phase difference with respect to said second component of said second signal.

22. The transducer of claim 21 wherein said phase differences are sufficient to cause said first spiraling wave and said second spiraling wave to each possess clockwise spiraling motion.

23. The transducer of claim 21 wherein said phase differences are sufficient to cause said first spiraling wave and said second spiraling wave to each possess counter-clockwise spiraling motion.

24. The transducer of claim 21 wherein said phase differences are sufficient to cause said first spiraling wave to have clockwise spiraling motion and said second spiraling wave too have counter-clockwise spiraling motion.

25. The transducer of claim 21 wherein said phase differences are sufficient to cause said first spiraling wave to have counter-clockwise spiraling motion and said second spiraling wave too have clockwise spiraling motion.

26. An apparatus, comprising:
an acousto-optic filter having a horn with an elliptical cross section coupled to a transducer.

27. The apparatus of claim 26 wherein said transducer is a transducing ring.

28. The apparatus of claim 27 wherein said transducer is a shear mode transducing ring.

29. A method of forming a transducer capable of generating spiraling acoustic waves, comprising:

piecing together sections of transducers that had polling directions along an axis and were broken to form said sections, said piecing together further comprising placing a first of said sections whose polling direction runs from an outer edge of said structure to an inner edge of said structure opposite that of a second of said sections whose polling direction runs from an inner edge of said structure to an outer edge of said structure.

30. The method of claim 29 wherein said transducer is a transducing ring and said transducers are transducing rings, said piecing together further

comprising placing a first of said sections whose polling direction runs from an outer edge of said ring to an inner edge of said ring opposite that of a second of said sections whose polling direction runs from an inner edge of said ring to an outer edge of said ring.

31. An apparatus, comprising:

a transducer for an excitation element capable of launching spiraling acoustic waves, said transducer comprising a first section whose polling direction runs from an outer edge of said structure to an inner edge of said structure opposite that of a second section whose polling direction runs from an inner edge of said structure to an outer edge of said structure.

32. The apparatus of claim 31 wherein said transducer is a transducing ring, said transducing ring comprising a first section whose polling direction runs from an outer edge of said ring to an inner edge of said ring opposite that of a second section whose polling direction runs from an inner edge of said ring to an outer edge of said ring.